

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
23 June 2005 (23.06.2005)

PCT

(10) International Publication Number
WO 2005/056971 A1

(51) International Patent Classification⁷: **E21B 7/28**

(21) International Application Number:
PCT/CA2003/001921

(22) International Filing Date:
11 December 2003 (11.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicants and

(72) Inventors: **ROTH, Raymond, G.** [CA/CA]; 4977 Perth Rd., 107, R.R. #1, Gadshill, Ontario N0K 1J0 (CA). **LAK-ING, Roger** [CA/CA]; P.O. Box 954, Simcoe, Ontario N3Y 5B3 (CA).

(74) Agents: **WONG, Jeffrey, W.** et al.; Borden Ladner Gervais LLP, 100 Queen Street, Suite 1100, Ottawa, Ontario K1P 1J9 (CA).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

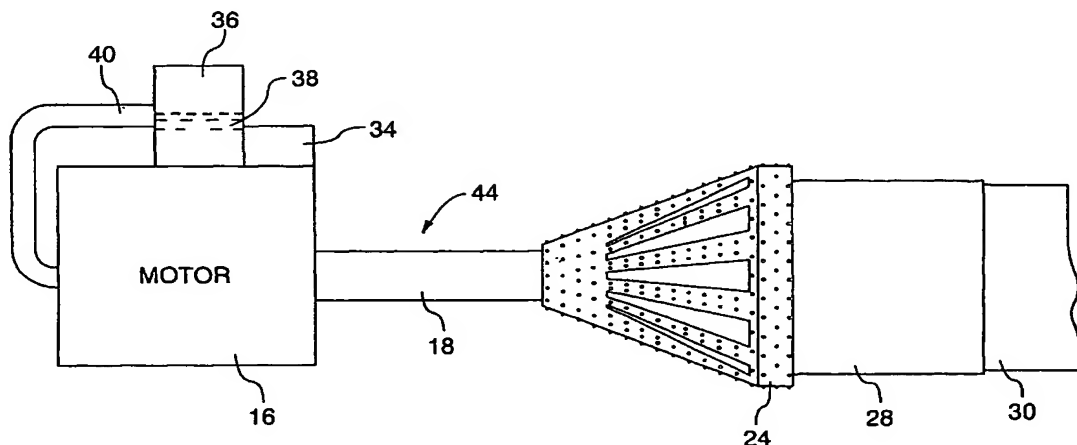
(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS FOR DIRECTIONAL DRILLING



(57) Abstract: The present invention is directed at a pullhead/reamer for use in digging a hole in the ground; comprising a first end (22) shaped to receive a mandrel struts, connecting the first end to the second end, the struts defining a set of open flutes (48) therewithin; and a set of slurry jets (50); wherein when the pullhead/reamer is in use, the set of slurry jets release a pressurized liquid to mix with the ground producing a slurry which enters the pullhead/reamer via the open flutes.